in plura dirimi *debet, tum nomen antea* commune *manebit* vulgatissimæ *et officinali plantae.*

It must be evident that when Fabricius removed *Cimex lectularius* from Cimex and placed it in a new genus Acanthia, he disregarded the rules of Linnæus, and his classification in this instance was rejected by Latreille and by many later writers. What would be thought of a naturalist who proposed to remove the dog from the Linnæan genus Canis, and to retain that generic name for the hyæna, which was included in the genus by Linnæus? According to Mr. Kirkaldy's contention this is the nomenclature we should be bound to adopt by the "rule of priority" if the individual who proposed the absurdity happened to be the first to divide the original genus.

Mr. Kirkaldy has not pointed out in what respect *C. lectularius* does not conform to the description of the genus Cimex as set forth by the founder. He probably refers to the mention of four wings amongst the generic characters, *C. lectularius* being apterous or nearly so. The objection is invalid in view of the facts already stated, and of the inclusion of the species in the genus by Linnæus, who prominently recorded the absence of wings in this case.

The subordinate question as to the type of Acanthia has been discussed *ad nauseam.* Anyone who feels interested in the matter will find a full history by Reuter in the *Wiener Entomologische Zeitung*, vol. i., 1882, p. 301. By an argument rather different from that above given, Reuter came to the same conclusion as to the type of Cimex. Mr. Kirkaldy's last proposal, to use Clinocoris for *C. lectularius,* is a curious illustration of his method. Clinocoris was suggested in the "Hemiptera Sueciæ" as a name to be substituted for the Fabrician Acanthia, because "*forsan convenientius judicabitur nomen Clinocoris.*" But this substitution of one name for another on the score of convenience is absolutely in defiance of the "rule of priority."

W. T. B.

Spawning of the Plaice.

THE plaice (*Pleuronectes platessa*) in the open-air pond at the Port Erin Biological Station started spawning on March 3, and those at the Piel (Lancashire) Sea-Fish Hatchery (under cover) on March 1. This is about a week earlier than last year (March 9). It would be interesting to know how this record compares with that of fish in the sea. At the time of writing I have no returns that will give the information for the Irish Sea, though I hope to know later. Probably the officials of the International Investigation will be able to speak of the condition in the North Sea, and those of the Plymouth Biological Station in regard to the English Channel. W. A. HERDMAN.

Liverpool, March 8.

Preliminary Measurement of the Short Wave-lengths discovered by Schumann.

FOR the past few years the writer has been engaged in an attempt to measure the short wave-lengths discovered by Dr. Victor Schumann, and very recently the attempt has proved successful.

Working in an atmosphere of hydrogen with a concave grating ruled on speculum metal, an "end-on" tube filled with hydrogen gives numerous lines below the aluminium group at 1854 Ångström units.

The shortest of these wave-lengths so far observed by the writer has a value 1206 Ångström units. Thus the measurable spectrum has been extended by 648 units.

It is interesting to note that, contrary to expectation, speculum metal is able to reflect these very short wave-lengths to a considerable degree.

The writer has in preparation a complete list of the new wave-lengths. He has also good hopes of still further extending the spectrum. THEODORE LYMAN.

Jefferson Physical Laboratory, Harvard University,
February 29.

Women and Sanitary Science.

IN your issue of February 11 a reference was made to a recent report of the Subcommittee on Technical Instruction for Women appointed by the Technical Education Board of the London County Council, quoting one of the recommendations of the committee that "Classes be established for the training of women in hygiene and sanitation with a view to their taking up the occupation of sanitary, workshop or public health inspectors, or of rent collectors."

May I urge in this connection the great importance of all training in hygiene and sanitation being thoroughly scientific in character and based upon practical teaching in chemistry, physics, physiology, and bacteriology?

"Hygiene," to quote Dr. T. M. Legge, H.M. Medical Inspector of Factories, "is not a science in itself, but is the meeting point where several exact sciences widely distinct from each other meet and yield up that element they possess which can be of practical use in the prevention of disease and the preservation of health."

At every turn the inspector or health worker is brought face to face with facts which can only be appreciated in their true light by a person who has had some considerable scientific training, and the greater their scientific knowledge the more enlightened and efficient will their work be.

Bedford College in 1895 established a scientific course in hygiene for women. While amply providing for the necessary practical demonstrations in hygiene proper, we continue to attach great importance to laboratory work in chemistry, physics, physiology, and bacteriology, as we believe the latter to be essential to a thorough teaching of hygiene, and necessary if women are to have a first-hand knowledge of the subject and become intelligent and effective workers. ETHEL HURLBATT.

Bedford College for Women, York Place, Baker Street, W.

Aërial Tubers on the Potato.

I DO not know whether the appearance of tubers on the stems of potatoes as well as underground is a frequent occurrence, but last season I noticed several plants presenting this appearance. One of the plants had a large number of underground tubers as well as those appearing above ground. The abnormal tubers were purple in colour; each one had several "eyes," and one or two minute green leaves showed in each "eye." The garden is a very stiff clay. The season was very wet as the potatoes were maturing; in fact, the ground was too soft to allow of digging at the proper time. My explanation is that the great quantity of water on the ground destroyed the balance between producing power in the leaves and storage power in the normal tubers, and that the surplus production deposited itself in the stems, which at the selected spots became modified tubers. W. TRAYLEN.

Guildford, Western Australia, January 28.

THE appearance of tubers on the haulm in the axils of the leaves is not uncommon, and as the bud and the tuber are homologous, the circumstance is only what might be expected.

In this country it is generally considered that some injury to the subterranean part of the plant, as by the spade or fork, or perhaps by wire worm or other destructive insect, is the inducing cause of the production of aërial tubers. I am, however, not aware whether this has been demonstrably proved. M. T. M.

March 8.

THE CEYLON PEARL FISHERIES AND THEIR ADMINISTRATION.[1]

A VERY remarkable feature of the Ceylon pearl fisheries has been their uncertainty and intermittent character. Thus only thirty-six fisheries took place during the nineteenth century, or, put in another way, for just half a century the fishery banks lay barren. These blank years sometimes followed one another in dreary succession, as may be seen from the fact that for seventeen years—from 1837 to 1854—and again for nine years—from 1864 to 1873—practically no fishing was done. For a decade before the investigation embodied in this report was begun the beds lay tenantless. Occasional breaks of five years or less account for the remainder of these years of famine. But this apparently inexplicable state of affairs is by no means of modern date; for centuries these fat and lean seasons have been the despair of those interested in the collection of these gems.

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[1] "Report to the Government of Ceylon on the Pearl Oyster Fisheries of the Gulf of Manaar." By W. A. Herdman, D.Sc., F.R.S., &c. Part Pp. xii+307. (London: Royal Society, 1903.)

All kinds of theories, or rather speculations, have been promulgated, but the mystery remained, until now, as impenetrable as ever. Undoubtedly, then, the immense importance and value of these fisheries called for some effort on the part of the Government, not only to attempt a solution, but also to find a remedy for these years of failure. To this end the Colonial Office, acting on the advice of Prof. E. Ray Lankester, invited Prof. Herdman to examine the records on this subject and to report to them. As a result of this report Prof. Herdman was induced by the Government to make a personal inspection of the pearl banks. Taking with him Mr. Hornell as his scientific assistant, he accordingly set out for Ceylon, and instituted a thorough examination of the whole question, the results of which are set out, in part, in the volume before us. Without doubt the task that lay before these investigators was no light one, and it is equally certain that it has been admirably fulfilled. As the pages of this volume show, the expedition has not only been abundantly fruitful in scientific results, but it has achieved the purpose for which it was dispatched.

A complete survey of the whole sea bottom of the pearl fisheries area has now been made, partly by sounding and dredging and partly by the aid of divers. In some cases even, Mr. Hornell himself descended in a European diving dress. By this survey a thorough knowledge has been gained, not only of the nature of the ground best suited for the growth of the pearl oyster, but also of the dangers by which this animal is beset.

Flourishing beds may be depleted by the ravages of boring sponges, boring molluscs, starfishes, internal parasites, and fishes, though the destruction wrought by these is generally slight compared with the wholesale destruction caused by shifting sands due to currents, or churned up by the south-west monsoon. By way of illustrating the vast scale of catastrophes of this kind, an instance—one of several—may be selected here. One bed examined in March, extending over an area of sixteen square miles, was covered with enormous quantities of young oysters "so closely packed that the bank must have held not less than about a hundred thousand million." Early in November of the same year this spot was revisited, when this vast host was found to have vanished, having been buried in the sand or swept down the deep declivity outside the bed.

The loss which results from overcrowding is, on some beds, almost as wholesale. If, however, Prof. Herdman's suggestions are carried out, this enormous waste will in future be prevented by the simple expedient of transplanting to sheltered spots affording suitable conditions for growth and infection. Nature has often to be assisted in the preparation of these spots by the process known as "culching," that is, scattering the floor of the bed with rock, loose coral, and so on, to afford the necessary anchorage for the byssus of the young oyster.

What havoc may be caused by starfishes can be gathered from the fact that a bank examined in March, 1902, lodged a crop of oysters estimated at $5\frac{3}{4}$ millions; by March, 1903, they had nearly gone!

Over-fishing is another source of danger, though in future, if Prof. Herdman's plan of transplanting is judiciously carried out, this need not be feared. In many places, it has been discovered, fishing may be carried on by dredging instead of by diving, though there are many places where the nature of the bottom will still compel the services of the native diver.

On the question of the formation of pearls this book contains much of great interest, and yet fuller details are promised in the next volume. Only in extremely rare cases did these investigators find that the nucleus of a pearl is formed by a grain of sand. Boring sponges and burrowing worms cause the formation of pearls or pearly excrescences on the inner surface of the shell by the irritation which they set up. Pearls of a peculiar kind are found in the muscular tissues, usually the levators of the foot. These also have no organic nuclei, but seem to start as minute calcareous concretions, and may be extraordinarily abundant. Thus, at the insertion of one of the levator muscles 23 small pearls were detected with the naked eye, whilst under the microscope 170 more tiny spherules were found. But the best "orient" or "cyst" pearls are those which occur in the mantle "or in the thick white lateral part over the stomach and liver, or even, secondarily, free in a cavity of the body." Caused by the secretion of concentric layers of nacre around the dead body of a parasite—generally that of a platyhelminthean larva—these pearls attain their greatest size in oysters of from three and a half to five years of age.

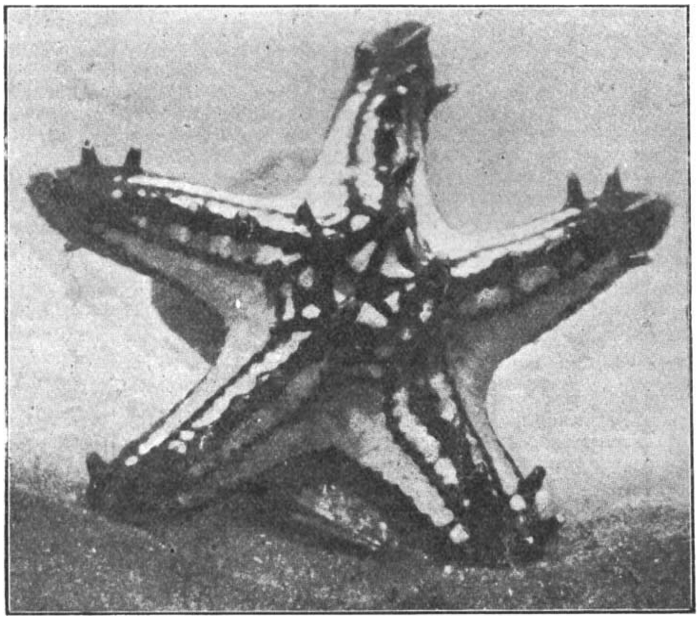

FIG. 1.—*Pentaceros lincki*, DeBl., lying on a large pearl oyster, half natural size. From a photograph by J. Hornell.

This parasite has an interesting history. Commencing life as a free-swimming embryo, it, in favourable circumstances, finds an entrance between the open valves of the oyster shell, or is drawn in by inhalent currents. The entry once gained, the next step is to bore into the tissues of the host, and here it undergoes the early stages of its growth. If the fates are propitious the host is eaten, and the developing worm escapes uninjured from the body of its first into that of its second host—a file-fish (Balistes). If the life-history is to be completed, the file-fish must in turn be swallowed by one of the large elasmobranchs, within the body of which the final adult stage is reached, and from thence escape the free-swimming embryos to renew the cycle. In these cases, however, where all runs smoothly—for the parasite—no pearls are formed. On the other hand, when the oyster escapes the file-fish, the larval parasite, unable to complete its development, dies, and becomes encapsuled by the pearly nacre deposited by the living tissues of the oyster upon the source of irritation.

Throughout his report Prof. Herdman bestows unstinted praise on the work of his assistant, Mr. Hornell, and there can be no doubt but that it is most thoroughly deserved, for much work of the highest importance was entrusted to him, and he in every case proved worthy of the trust. We are therefore glad that Prof. Herdman's wish has been fulfilled—that Mr. Hornell should be asked to continue his observations as marine biologist at the Galle Laboratory—for he will now be able to render "signal service to the pearl, sponge, trepang and other marine fisheries of the Colony."

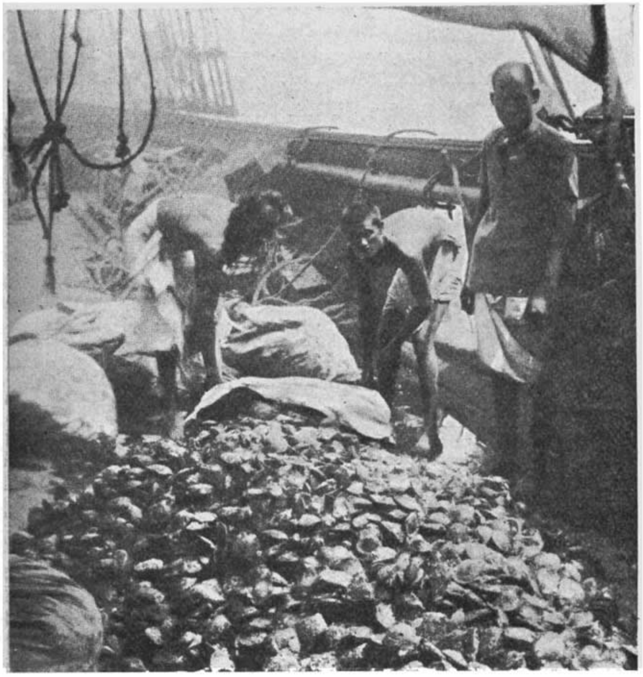

FIG. 2.—Valuation sample of pearl oysters from the Cheval Paar, being brought on board the *Rangasameeporawee* from the inspection boats. From a photograph by J. Hornell.

In concluding this notice we must not omit to mention that a series of separate reports has been prepared by various specialists on material collected during this investigation. Seven of these reports are included in the present volume, and others are to follow. The first of these deals with the geology of the sea-bottom, and describes the formation of the peculiar bottom essential to the presence and well-being of the pearl oyster. Mrs. Gepp, in an account of the algæ collected, describes the hitherto unknown fructification of a species of Halimeda.

The remaining reports are zoological, and describe the Gephyrea, Chitons, Holothurians, Cephalochorda, and Copepoda. Mr. Tatersall's report on Amphioxus will be read with great interest. No less than seven of the eleven species known occur around Ceylon. "The tables at the end of the report show how extremely variable the species of the group are, and the more extended our knowledge of this group becomes the less do the species appear to be separated." The report on the Copepoda, by Messrs. Thomson and Scott, is by far the largest of these supplementary reports, and embraces descriptions of no less than 283 species, of which 76 are new to science.

Further description of this most valuable book we cannot give. It must be read to be appreciated. The vast wealth of information contained in Prof. Herdman's report on the pearl oyster alone demanded far more space than we have been enabled to afford it. Enough, however, has probably been said to show that the commission was not only completely justified, but has resulted in a rich harvest of facts which appeal not merely to those interested in the pearl fisheries or to students of mollusca, but to the biologist the world over.

The volume is well bound, well printed, and profusely illustrated. W. P. P.

THE CAMPAIGN AGAINST MALARIA.[1]

THE unhealthiness of many tropical countries is largely due to the prevalence of malarial diseases. The discovery that a particular kind of mosquito is the definitive host of the malaria parasite paved the way for a method of prevention based upon the destruction of the malaria-bearing mosquitoes, which, so far as present knowledge goes, all belong to the genus Anopheles. At first the measures of prevention were individual rather than general, and included the destruction of mosquitoes in and about the house, and their exclusion by nets and wire gauze. But through the labours of Major Ronald Ross on the west coast of Africa, and of the Americans in Cuba and elsewhere, it has been shown that much may be done to free a whole town from mosquitoes, thereby diminishing the incidence of malaria.

The report under review details the measures initiated in India by the members of the Royal Society's Malaria Commission to test the efficacy of mosquito destruction in the prevention of malaria. The station selected was Mian-Mir, a cantonment near Lahore, the garrison of which consists of about 3900 officers and men, British and native, and of 600 native followers. Situated in a plain with an average rainfall of about 20 inches, little of the surface water can drain away, especially as the subsoil is exceedingly impervious, so that after one or two hours' rain the locality becomes flooded. In addition there are numerous brick-work surface drains, which become filled and form excellent breeding-places for the Anopheles until dried up by the sun. Owing to these conditions, Mian-Mir is one of the most unhealthy cantonments in India, the mean annual admission rate for ague among European troops averaging 663 per 1000. Six species of Anopheles were found to be present, of which *A. Rossii* was the most abundant, the numbers reaching a maximum in September and October.

The methods of prevention adopted were (1) the cleaning of irrigation water courses, smoothing their sides, and where possible lining with brick and cement; (2) drying out and cleaning branch water courses every ten days; (3) treatment of water courses with kerosene oil; (4) draining small collections of stagnant water;

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[1] "The First Report of the Anti-malarial Operations at Mian-Mir, 1901–1903." By Capt. S. P. James, I.M.S. (*Scientific Memoirs* of the Government of India, No. 6. Calcutta, 1903.)